Dup Room 53
not dup

THE

35-29

ELECTRICAL WORLD.

A WEEKLY REVIEW OF CURRENT PROGRESS IN ELECTRICITY AND ITS PRACTICAL APPLICATIONS.

Vols. XI. and XII.

From Jan. 1, 1888, to Dec. 31, 1888.

NEW YORK:
W. J. JOHNSTON, Publisher
168-177 POTTER BUILDING.

INDEX TO VOLUME XI.

* Illustrated articles. The weekly Departments are not indexed.

REVIEWS OF NEW BOOKS.

"American Electrical Directory, 1887-8".. 290
"Kalender fur Elektrotechniker"..... 14
"L'Electricité ; Notions et Applications Usuelles"..... 14
Ninth Annual Meeting of the National Telephone Exchange Association"..... 14
"Induction Coil, Phenomena of Retardation in the"..... 26
"Fleeming Jenkin, Memoir of"..... 26
"First Steps in Electricity"..... 38
"Art of Projecting, The"..... 38
"Animal Magnetism"..... 38
"Management of Accumulators and Private Electric Light Installations"..... 50
"Course of Lectures on Electricity, A"..... 62
"Annuaire du Bureau des Longitudes"..... 74
"L'Année Electrique"..... 74
"Thermo-Dynamics"..... 88
"Practical Physics for Schools"..... 136
"Formulaire Pratique de L'Electricien"..... 136
"Electro-Deposition, Theory and Practice of"..... 136
"Dynamo Tenders' Hand-Book"..... 174
"Principles of Dynamo-Electric Machines, and Practical Directions for Designing and Constructing Dynamos"..... 174
"American Street Railways"..... 240
"Betrieb der Galvanoplastik mit Dynamo". 252

CORRESPONDENCE.

Animal organism on the electric current, Effects of..... 151
Animal organism on electro-magnetic action, Effects of..... 124
Alternating currents in contiguous wires.. 124
Alternating current circuits and fire alarm wires..... 68
*Balancing a rotating body..... 330
Balancing moving parts..... 307
Ball room by accumulators, Lighting a New York..... 41
Batteries of unequal strength in circuit..... 8
Breaking incandescent lamps in explosive gases..... 14
Calculations, Queries as to..... 122
Carbon as a positive element..... 242
Carnot's law..... 186
Central America, Electric lighting in..... 30
Challenge, A renewal of the storage battery 40
Competition declined, The storage car..... 66
Disc dynamos, The E. M. F. of..... 180
Dynamo plants, Built up..... 242
Engineering, Analogies between electrical and mechanical..... 253
Error in a book pointed out, An..... 7
"Freak" theory, The lamp..... 126
Freak, The incandescent lamp..... 81
Gas evolved from storage batteries, The.... 214
Gravity cells, Lighting small lamps with... 125
He would..... 198
Humming wires, Remedy for..... 76
Incandescent lamp as a condenser, The..... 124
Induction on telephone lines..... 180
*Improvements in the quadruplex..... 330
Jamaica, L. I., electric railway, Alleged accident on..... 331
Kapp or Silvey ?..... 186
Lamp life of 9,700 hours, A..... 125
Leclanché porous cups, Renewing..... 20
*Magnets, Consequent Pole (Corr.)..... 294
Magnets, Heating..... 278
Magnets with consequent poles..... 242
Maver-Jones discussion of the quadruplex..... 330
Mechanical and electrical engineering, Analogies between..... 198
Motors and commutators..... 65
Motors, The power of..... 4
Mr. Silvey on his defense..... 212
National Electric Light Association..... 38
Non-magnetic watches on railways..... 125
Number of arc lamps in use, The..... 200
Ocean telegraphy with Morse key..... 316
Oxide of copper battery for incandescent lighting..... 148
Platinum wire, Effects of heating..... 94
Primary battery lighting..... 242
Pronunciation of the dynamo, The..... 284
Quadruplex, Improvements in the..... 296
Quadruplex, Improvements in the..... 316
Quadruplex, The discussion on the..... 305
Rats, Electricity and..... 81
Relays in circuit, Effect of..... 180
Reversing electric motors..... 154
Rotating body, Balancing a..... 316
Secondary battery cars, A challenge for.... 3
Several queries..... 200
Shock, Protection of linemen against..... 200
Shunt and series coils on compound dynamos, Relative position of..... 136
"Slap dash" rule for wiring, A..... 270
Static charge on incandesent wires..... 228
Static electricity and incandescent lamps.. 216
Static electricity on incandescent lamps, Effects of..... 178
Storage battery challenge, The..... 28
Storage cars, Long-winded..... 20
Telephone transmitter, Long-distance..... 278
Thomson's electrometers..... 214
Unit of resistance, The..... 168
Useful electrical society, A..... 50
Westinghouse lamp, Long life of a..... 30
Winding armatures and polarity of brushes 81
Wiring, Alternate current..... 331
Winding a dynamo..... 331
*Wiring buildings..... 125
Wiring houses for different systems..... 242
Wire joints..... 126

THE TELEGRAPH.

*Annunciator, A dial..... 200
*Brooklyn, The police telegraph department in..... 317
*Cable transmission, A new system of.. 292
*Catlin grip, The..... 151
Cloud telegraphy..... 308
Dinner, A telegraphers'..... 192
*Dynamo-electric machines in telegraphy, The new plant in the Western Union Building, New York..... 67-79
*Fire alarm system, A new automatic..... 291
Government telegraphs, The agitation for.. 52
Improvements in quadruplex telegraphy.—I., II., III..... 254, 266, 280
Insulating wire, A new process for..... 204
*Irish's railroad block and inter-communicating system..... 316
Long distance telegraphy..... 201
*Maver's "Improvements in Quadruplex Telegraphy," A criticism on..... 290
Michigan telegraph line, A..... 268
Moneys due the government, Telegraph.... 155
*Morse key, Simultaneous transmission by a single..... 141
*Printing telegraphs, A new departure in.. 2
*Quadruplex, Improvements in the..... 292
*Renewing telegraph and telephone wires.. 148
Returns, Telegraph..... 333
Storm and its work, The great..... 148
Submarine telegraphy, Telephone signals in. 214
Taxes on telegraph companies, State..... 168
Telegraphers, Co-operation among..... 243
*Telegraphic delays, The United States Supreme Court on..... 64
*"Unique" combination telegraph set, The. 41
Wire space in large buildings..... 88
Wiring, Formulas for..... 241
Wiring, Contracts for..... 135
*Wright's automatic telegraph..... 29

THE TELEPHONE.

*Acoustic telephone, The evolution of the .. 304
Bell Telephone Company, The annual meeting of the..... 179
Bell telephone patents sustained by the United States Supreme Court, The..... 154
Bell, The decision of the United States Supreme Court in favor of..... 163
Caloriphone, The..... 175
*Decision as to telephone rates at Rochester, N. Y., An important..... 55
Europe, The use of the telephone in..... 155
Insulation and installation of wires and construction of plant..... 102
Mexico, The telephone in..... 217
*Overhead circuits for long-distance telephony..... 161
*Phonograph, The..... 258
*Phonograph, Edison's new..... 5
*Radiograph, The..... 224
Telephone decision, Opinions on the..... 167
St. Louis, Telephone Tests in..... 68

THE ELECTRIC LIGHT.

*Amphion Academy, Brooklyn, The electric light plant in the..... 199
Amyloid carbon for incandescent lamps.... 38
Arc carbons, Dimensions of..... 226
Arc lamp, A new..... 315
*Bernstein system of series incandescent lighting, The new..... 227
*Berlin electric lamp posts..... 328
*Bernstein system of series incandescent electric lighting, The..... 65
Boston & Albany Railroad, Station lighting on the..... 5
Carbon point, What constitutes a good..... 112
Carbons for arc lamps..... 227
Chicago meeting of the Edison Association, The..... 80
*Cunynghame's magnetic cut-out..... 267
Dust on electric light wires, The accumulation of..... 122
*Edison municipal lamp, The new..... 74
*Engine for electric lighting, New automatic cut-off..... 230
Exhibits at the convention, Notes and..... 119
Explosive gases, Incandescent lamps in..... 280
*"Freak," An incandescent lamp..... 26, 54
*"Freak," Another lamp..... 162
Fire insurance, The relation of electric lighting to..... 111
Fuses for electric light circuits, Safety..... 122
*Heisler series incandescent system, The.... 123
*Hines' "eliminator" for electric lighting steam plants..... 45
*House-wiring, A diagram showing the size of conductors for..... 202
*Hussey re-heater for electric light plants, The..... 97
Incandescent lamps..... 150
Incandescent lamp freak, Some additional data on the..... 66
*Incandescent lamp, A 1,000 c. p..... 179
Insurance rates for electric lighting, A reductionof..... 186
*Maximum efficiency of incandescent lamps, The..... 190
*Maximum efficiency of incandescent lamps, Discussion of the..... 217
*Maximum intensity in arc lights, Zone of.. 201
*Megascope, An electric..... 29
Mexico, Electric Lighting in..... 126
National Electric Light Association, The... 242
National Electric Light Association, The history of the..... 74
National Electric Light Association, The next meeting of the..... 20
National Electric Light Association, Seventh meeting of the..... 102
Nature of the current in incandescent lighting, How to determine the..... 135
*Norfolk, Va., Thomson-Houston station.. 327
Paris, Electric lighting in..... 126
Pinwheel, An electric arc..... 40
Pittsburgh Convention, Preparations for the..... 68
*Portable electric light plant, A..... 53
*Reflector, A marine..... 318
*Reflector shade for incandescent lamps.... 74
Report of the New York Board of Electrical Control, The..... 17
*Rochester, N. Y., The Brush electric light station at..... 187
*"Rookery" plant at Chicago..... 330
Rules for electric light installation..... 202
Safety fuses for electric light circuits..... 15
Safety lamps, Electric..... 126
*Schuyler series incandescent lamp, The.... 257
Seel incandescent lamp filament, The..... 267
Series glow lamps..... 92
*Southern engine for electric lighting, A... 32
*Suez Canal by the electric light, Navigating the..... 6
Trains, The electric lighting of..... 214
United States Company, In favor of the... 269
Why do incandescent lamps blacken ?..... 138
Wind power for electric lighting..... 315

ELECTRIC POWER.

*Allegheny City, Pa., The Bentley-Knight electric railway in..... 92, 255
*Alternate current motors and transformers, A new system of..... 281
*Alternating current electric motors..... 95
*Ansonia, Conn., electric railroad, The.... 329
*"Belding" motor, The..... 127
*Bentley-Knight electric railway system, The..... 63
*Bentley-Knight electric railway system at Allegheny City, The..... 75
Bessbrook & Newry electric tramway, The. 16
*Brush electric motors..... 41
*Building operations, The electric motor in. 5
*C. & C. shunt wound motor, New..... 125
*Carbondale, Pa., electric road, The..... 244
*Daft electric railway motors for Pittsburgh. 89
*Daft motor and Worthington bucket and plunger pump, Combination of..... 14
Dog-cart, Volk's electric..... 41
Electric motor in 1849, The..... 225
*Elevators, Operation of, by electricity..... 303
*Fisher electric railway at Detroit, The..... 51
*Flour mill operated by electric motors, A western..... 225
Governing electric motors, Note on..... 333
*Haulage in cotton mills, Electric..... 201
Holtz machine into a motor, Converting a.. 55
Invention in methods of motor regulation, Priority of—I. II..... 176, 187
*Jewelry by electric power, Manufacturing. 176
*Julien electric car, New switch..... 161
Lineff electric tramway, The..... 78
*Lykens Valley coal mine, The electric railway in the..... 303
Madrid, Transmission of power in..... 137
*"Magnet," The electric boat..... 319
*Mine hoisting by electricity..... 279
Motors, Electric..... 106
Municipal rapid transit problem, The solution of..... 328
*Newspaper offices, The electric motor in.. 279
*Oerlikon machines, Electric transmission of energy by..... 42
*Organs and launches, Electric motors for.. 137
*Patten electric motor, The..... 7
*Printing establishments, The electric motor in..... 15
*Printing office, A Daft electric motor in a. 315
*Richmond, Va., The Sprague electric road at..... 306
*Schlesinger's electric locomotive motors.... 88
*Schwedoff's thermo-magnetic motor experiment..... 92
*Short electric railway at Columbus, O., The 241
Sprague electric railway at Richmond, Va., The..... 65
*Stamping bills and other documents by the electric motor..... 175
Stamping mill, Electricity in a..... 317
St. Catharines, Ont., The Van Depoele electric railway at..... 3
*Tests of electric motors for amateurs, Efficiency..... 50
*Torque of motors while stationary, Measuring the..... 30
*Traction, Accumulators vs. direct currents for electric..... 186, 240
Traction calculations, Electric..... 38
Tram cars, A new electric motor for..... 244
*Trunk engine and Victoria dynamo, High speed..... 41
Underground railway for Chicago, An. ... 334
*Waddington electrical submarine vessel, The..... 136

DYNAMOS, SYSTEMS OF DISTRIBUTION, ETC.

Alternate currents, The distribution of energy by..... 113
*Alternate current transformers, with special reference to the best proportion between iron and copper..... 139
*Alternating current dynamo, A new..... 305
*Alternating current dynamos in parallel, The coupling of..... 174
Alternating currents, The energy of..... 114
*Armature protector, A novel..... 294
*Brushes, Preserving dynamo (Corr)..... 242
*Built-up dynamo plants..... 160
*Built-up dynamos (Corr)..... 198
*Calculating and designing dynamos and motors, A practical method of..... 215
Co-efficient of self-induction, The variation of the..... 279
Construction of dynamo-electric machines, The..... 327
Continuous current transformation..... 228
Continuous current vs. the alternating current, The..... 295
Current distribution of the near future..... 26
Diseases of dynamos, The..... 15
Distribution of time, The electrical..... 41
* Distribution of electricity, The comparative value of the continuous and alternating current systems for the commercial..... 152
* Dynamo, self-regulating, A small..... 244
* Dynamo and accessories, A novel..... 243
* Eickemeyer dynamo, The..... 213
*Electro-dynamic rotation by means of alternating currents..... 293
*Engine and dynamo, Combined..... 320
* Induction coils, Experiments on—I., II., III..... 160, 212, 252
* Induction coil, A new form of..... 214
Iron-clad dynamos, Designing..... 3
* Kennedy's compound-wound dynamos.. 54
Lag in transformers, The..... 187
* Wire-sewed leather belting for dynamos.. 44
* Mayo incandescent dynamo, The..... 175
*Schools, etc., Experimental apparatus for. 318
Secondary generators or transformers, The distribution of electricity by means of.... 154
* Siemens' new ring dynamo..... 19
* Silvey dynamo and motor, The..... 125
* Slattery induction system, The..... 77
* Steam dynamo, A new..... 225
* Thone dynamo, The..... 179
Top, The induction..... 56
* Transformers, Alternate current..... 153
* Turbo-electric generator at Newport, R. I., The..... 255

BATTERIES, ELECTROLYSIS.

*Carbon battery, A new..... 200
Carrière accumulator, The..... 150
Clark standard cells..... 317
Cox gelatine battery, The..... 8
*Dry battery, A new..... 216
Electrodes for secondary cells, Carbon..... 4
Electrolysis..... 160
Electrolysis, Experiments on..... 333
*E. P. S. accumulator, Improved..... 40
*Galvanometric battery, A..... 302
*Gibson storage battery, The new..... 162
*Grenet battery and motor, Combination .. 226
*"Law" battery, The new..... 168
*Leclanché battery, Improved..... 226
Mercury, Electrolysis of by the action of alternating currents..... 333
Partz's depolarizing compound..... 138
*Primary battery, A novel form of..... 168
Primary batteries, Some hope for..... 291
*Samson primary battery, The..... 307
Schanschieff primary battery, The..... 167
Secondary battery, A new form of..... 224
Soap battery, A..... 78

MECHANICAL, ETC.

Armington-Sims engine, The new..... 69
*Belt controller for dynamos, A new..... 127
*Belt holder and shifter, A new..... 294
*Compounding engines, Reheating steam for..... 202
*Engine, A new electric light..... 8
Engines for incandescent light stations, Independent..... 108
*Fire alarm attachment, Denio's..... 6
*Gas-lighting attachment, A new electric... 257
*Hill clutch coupling for electric light stations, Improved..... 307
Leather belting, Its origin and progress.... 105

INSTRUMENTS, ETC.

*Alternating and undulatory currents, Electric wave and phase indicator for..... 39
Actinometer, An electric..... 329
*Balance, Sir Wm. Thomson's new composite electric..... 318
*Dynamometer, Von Hefner Alteneck's hydraulic..... 64
*Dynamometer, A new..... 2
Electroscope, A simple..... 329
*Electrolysis of copper sulphate in the standardizing of electrical instruments, The.... 229
*Electrometer, A new quadrant..... 293
*Galvanometer, A new form of..... 278
*Galvanometer suspensions..... 224
*Galvanometer, A swinging arm..... 271
*Galvanometer with lamp and scale, A new pattern of reflecting..... 189
*Harcourt's new pentane standard lamp.... 127
Induction apparatus for studying dynamos. 291
*Irish's electric regulator and meter..... 66
Magnetometer, A new..... 175
*Maquaire's electro-dynamic balance or regulator..... 30
*Mather Electric Company, Instruments of precision of the..... 149
Meter, A new current..... 244
*Resistance standards, On compensated..... 295
*Secohmmeter, A new form of..... 302
*Speed indicator, A new..... 226
*Testing telephone transmitters and induction coils, Instrument for..... 242
*Thomson bridge for the measurement of small resistances..... 62
*Thomson's electric meter..... 214
*Thomson's, Sir Wm., New standard measuring instruments..... 89
*Voltmeters for measuring alternating potential differences, Portable (Corr.), 43, 56, 68, 128

EDITORIAL.

Fifteenth year well, beginning its..... 101
Breaking the record once more..... 101
Pittsburgh, The electric light convention at. 101
Electric light convention, Notes on the..... 121
Bell, The verdict in favor of..... 147

THERMO-ELECTRICITY.

*Acheson's cal-electric generator..... 7
Acheson thermo-electric generator, The.... 17
*Coal, Electricity direct from..... 38
*Electric energy from carbon without heat, Obtaining..... 16, 28
*Menges thermo-magnetic generator and motor, The..... 55
*Thermo-electricity, Some researches in.... 93
Thermo-electrical properties of bismuth, On the effect of magnetization on the..... 92
Thermo-electric element, A new..... 174
*Thermo-electric battery, A new..... 198

UNDERGROUND WIRES.

Brooks underground system, The new..... 257
*Conductors, On a new system of underground electrical..... 31
Europe and America, Underground conductors in..... 270
Conductors for electric currents..... 116
Undergrounding of electric arc light wires, The..... 115

PATENTS.

Patent court and uniformity of Patent Office practice, The..... 283
Patent laws, The proposed bill to appoint a commission to amend the..... 29
Patent law reform..... 104
Patent law revision, A few comments on.. 14
Patent practice, The act of March 3, 1887, and how it affects..... 303
Patent reform question once more, The ... 52
Patent system, Reforms of the..... 186
Patents, The annual report of the Commissioner of..... 76
Patents, Limitation of United States..... 199

MISCELLANEOUS.

*Alarm, A simple (Corr.) 198
Alarm clock arrangement, Another electric 308
American Institute of Electrical Engineers, The 244
American Institute of Electrical Engineers, annual meeting, The 268
American Institute of Electrical Engineers, The work of the 4
Animal organisms on electro-magnetic action, Effects of 74
Atmospheric electricity 314
Atmospheric electricity, Observations on 27
Atmospheric electricity on rain, Action of 175
*Aurora borealis, Illuminating the 138
Balsam, Electrified 42
*Bell, A new 44
Belgian electrical syndicate, A 138
Boiling sulphur, The conductivity of 214
Boston Electric Club, First anniversary of 333
Bright, The death of Sir Charles 240
*Butz electric valve, The 267
*Camera, An electric detective 161
*Cannons, An electro-magnet made of two 27
Carbon in the sun 326
Chemical generators of electricity, The possibilities and limitations 271
Coal cutting machine, A new electric 217
Cobalt, The electric resistance of 179
Continuous current, limited, versus the alternating current, unlimited, The 283
Copper pipes, Electrolytically formed 74
*Cotton printing by electric power 253
*"Crowfoot" zincs, An improvement in 30
Dangerous currents, M. D'Arsonval on 308
Death by the electric current, On 289
Death by the electrical current, On the causes of 302
Death by electricity, On 320
Death by the electric current, On 266
*Dental electrics 267
*Developments of electricity, Recent 126
Diamagnetism, The theory of 306
*Diaphragm valve, An electrically controlled 168
Dreams, Note on electric shock in 279
Effect of light on the electric discharge, On the 123
*Electrolytic decomposition of certain alloys, Experiments on the possible 53
*Electro-engraving machine, The 90
Electro-magnet, The steam 257
Exchange, An electric 192
Execution by electricity 27
Firing high explosives by means of electricity 136
Foucault pendulum experiment, The 137
*Gas lighting burners, Improvements in electric 226
Gold and Stock Life Insurance Association, Annual meeting of the 28
Heating effects of electric currents, On the 256
*Heating substances by electricity in gases under high pressure 122
Human body from dangerous currents, Protection of the 270
Insulating compound, A new 304
*Irish's electric watchman's register 329
*Joining wires, A new coupling for 167
Laboratory, The new Edison 259
Lifting-power of magnets, On the formulæ of Bernouilli and Hæcker for the 333
Lightning rods, The price of the factor of safety in 88
Liquids, Electrostatic attraction in 148
Lock, A new electric combination 294
Magnetic Club, The 227
Magnets, Tempering 291
Magnets, Tubular 175
Magnet, The steam electric 201
Magnesium as a positive element 175
*Magnetism in watches 331
Massachusetts Institute of Technology and its influence upon electrical progress, The 269
Mechanical engineering, Electricity in its relation to 6
*Mechanical and electrical engineering, Practical analogies between 137, 177
*Mechanical and electrical engineering, Practical analogies between (Corr.) 228
*Metals in magnetic fields, The elongation and contraction of 242
Mica, Uses of 227
*Molecularium, Berliner's 4
New England Electric Exchange, Meeting of the 198
New York Electrical Society, Meeting of the 278
Nickel-plating solution 94
Nitric acid, Conductivity of 214
1874-1888 97
1887, The electrical progress of 18
Optical demonstration of electrical stress, The 123
*Ore-tester, An electric 198
Osmose, Electric, and electro-capillary action 51
Peat as an insulating substance, Treatment for 138
*Pen, A stylo-telegraphic 151
*Phelps, The death of Geo. M., Sr 268
*Pump, An electric 257
*Safeguard against shock from high tension currents 179
Selenium, Peculiar properties of 175
Sleep preserver, An electric 3
Static electricity, Demonstration of the laws of 224
Steam pressure records, Economic value of 110
Testing water 294
*Thermostat, A new 52
*Type-writer, An electrical 14
Vacuum, The conductivity of a 315
Vibrating strings, Electrical method of rendering visible the form of 123
*Volt, the ohm and the ampère, The 178
Watches against the influence of magnetism? How can we protect our 103
*Watchman's clock, New 200
*Watchman's time detector, An improved 244
*Welding by means of the arc, Electric 91
*Weston, Edward. ELECTRICAL WORLD portraits—I 278
What shall we read?—I., II. 314, 326
*Wiley stock printer, The 15
Wines, Maturing by electricity 201
Windmills for generating electricity 51

NEW BOOKS.

"Telephone Troubles and How to Find Them" 2
"Municipal Lighting" 2
"The Dynamo; How it is Made and How to Use It" 2
"Hall's Patent Estate" 14
"Aide Mémoire de l'Engenieur Electricien" 14
"Geschichte der Transformatoren" 14
"Fortschritte der Electrotechnik" 92
"Naval Reserves—Training and Matériel" 170
"National Electric Light Association, Proceedings of the" 170
"Dynamo-Electric Machinery" 170
"Die Erzeugung und Verteilung der Elektricitaet in Zentral Stationen" 182
"Preparations for Indication" 182
"Elements of Electric Lighting" 182
"Materialen fuer Kostenvoranschlaege Elektrischer Lichtanlagen" 194
"Elektrische Apparate Maschinen und Einrichtungen" 206
"L'Accumulateur Employé comme Transformateur-Distributeur" 274
"Diamagnetism and Magne-Crystallic Action" 274
"Steam Boiler Catechism, The" 274
"Electric Motor and its Applications, The" 286
"Report of the Chief of the Bureau of Navigation" 312
"Kalender Fuer Electrotechniker" 324
"Fortschritte Der Elektrotechnik" 324
"Etude Theorique des Transformateurs" 324

CORRESPONDENCE.

Anti-induction telephone devices 324
Armatures, The shape and size of 150
Artillery practice, The electric light in 161
*Balancing armatures 8
Baxter dynamo, The winding of the 81, 138
Brantford, Canada, The telephone at 86
Callender conduits in England and America 253
Circular mils defined 67
Clark standard cells 57
Disruptive discharges in cables 268
Dogs, Experiments with electric current on 86
Dynamo construction, Practice in 52, 86
Dynamo Troubles 327
Dynamo trouble, A 223
"Electric" leather belting 32
Electrical instruction in Chicago 28
Electrometer formula, An absolute 94
E. M. F. at different spark lengths 57
Evasive answer, An 170
Explanation, An 327
Filtering mercury 298
Flow of current 54
Gas lighting circuits, Locating troubles on electric 150
Gas mains as electric conduits, The danger of 342
Gramme armature, Elongating the core of the 26, 81
High tension currents, Control of 57
Holtz machine, Electrical execution with the 86
Induction on telephone wires 4
Insulation resistance of gas lighting circuits 230
Law lightning arrester, The 194
Leber regulating incandescent light, The 223
Lightning rods, The value of 52
Lockwood anti-induction arrangement, The 303
Loose screw contacts, Dynamo troubles from 250
Magnets, The best proportions for permanent 161
"Magnet," Motor-winding of the launch 15
Maver-Jones quadruplex controversy, The 316
Morse on the cables 57
Moving parts, The balancing of 29
Primary batteries, A discrepancy pointed out as to 20
Primary batteries, Tests of 148
*Primary battery tests 106
Petroleum fuel for electric light stations 161
Quadruplex controversy, The 276
*Quadruplex, Improvements in the 231
Resistance coils, German silver 138
Rotating bodies, The balancing of 29
Self-induction, Hughes on 150
Simultaneous telegraphy and telephony in America 276
Snell, Mr. Albion T., on the Sprague motor 328
Static charge on incandescent lamps, Effect of 253
Storage car regulating switches 78
*Switch for storage battery cars, Regulating 53
Telpherage priority 315
Telpherage, Priority in 303

TELEGRAPH.

Baudot's isochronous regulator 324
Belgium, Military telegraph in 255
*"Come Along" for linemen, new automatic 151
Current, Minimizing the baneful effects of the extra 326
*Delany's cable transmitter, Test of 226
*Delany's electrical bulletin board 38
Highways, Electric lines on public 199
Jacksonville telegraphers, Aiding the 244
Lightships, A new system of telegraphing with 147
Long telegraphic lines, New methods of improving the working of 325
Mackay, A magnificent present to Mr. John 345
Maritime telegraphing 197
Messages, Interception of 252
Old time telegraph operators and United States Military Telegraph Corps, Reunion of 97
*Pittsburgh, Pa., The dynamo telegraph plant at 195
*Postal telegraph company's dynamo telegraph system, The 65
Railway telegraph superintendents, Seventh annual meeting of the association of 31
Rapid telegraph property, A decision as to the 171
Sea telegraphy 92
*Sibley, Hiram, Obituary 26
*Simultaneous telegraphy and telephony, A new system of 264
Solder for telegraph wires 343
*Spectro-telegraphy 27
Telegraph Reunion, The 66
Telegraphers' Mutual Benefit Association, 170, 290
Telegraphers, Brave 182
*Telegraphy with superposed pulsatory and undulatory current signals, I., II., III., IV., 96, 133, 156, 185
Ticker war in New York, The 188
Trans-Pacific cables, Proposed 20
Western Union Company, Annual Report of the 208
Western Union earnings 331

TELEPHONE.

American Bell Telephone Company, Decision against the 278
*Apparatus, Some novel telephone 298
Bell telephone victory, Another 38
*Colburn magneto machine for telephone exchanges, The 288
Cushman telephone case, The 252
*Exchange system, Van Size's telephone 300
*Gramophone, The improved 80
*Gramophone, The 16
Gramophone and telephone records, On some possible methods for the preparation of 21
*Induction on telephone circuits, Preventing 288
Krebs telephone, The 227
National Telephone Exchange Association, Tenth annual meeting of the 139
Paris-Brussels telephone 325
*Phonograph in England, The Edison 55
*Phonograph, Some possible forms of 116
*Phonograph and graphophone, The new 183
Phonograph, Uses of the 158
Phonograph, A possible application of the 157
Phonograph, Impossible forms of 157
Phonograph as a ruler of posterity, The 55
Radiophone, An electro-chemical 15
Resistance of telephone conductors, On the proper 93
Statistics, Telephone 243
*Telautograph, The Gray 64
Telephone conductors, On the proper size of 64, 114
Trouble, telephone, A curious 93
Trouble, telephone, Another 114
*Water-jet telephone-transmitter and system of telephonic communication, C. A. Bell's 68

ELECTRIC LIGHT.

*"Andrews" and "Lang" switches, The 316
America, Electric lighting in 187
*Arc lamp, A simple 81
Berlin, Electric light in 303
Boiler inspection, Incandescent lamps for 7
*"Boston," The Brush lighting plant for the man-of-war 238
*Breakage of an incandescent lamp, Peculiar 170
*Bryant switch, The 255
*Colburn arc and incandescent system, The 277
Cologne, A portable installation for 256
*Colorado Electric Company at Denver, Colo., The plant of the 103
Condensing apparatus in electric light stations, The importance of 266
Decisions in England, Important electric light 25
*"Dynamic" switch, The new 151
Edison at Schenectady, A day with. Supp. Aug. 25 1-12
*Edison ground detector for electric light circuits, The 6
Edison illuminating companies, Eighth meeting of the association of 82
*Edison station, New York, Uptown 241
*Electric light plant, A remarkable 94
Electric lighting station as a nuisance, An 174
*Equitable building, Boston, Lighting the 305
*Ferranti alternating system, The Deptford central station 299
Fishing, The use of electric light in 18
*Gerard arc lamp, The 264
*Globes for electric lamps, Novel 312
*Grosvenor gallery central station, London, The 287
*Hanging device and switch for arc lamps, New Van Depoele 228
*Heisler plant at Ogden, Utah, The 227
*Heisler plant at Wabash, Ind., The 4
Incandescent lamps, Blow out in 198
Incandescent lamps, Peculiar behavior of 114
Lamp, The efficiency of the electric 227
Leads, A table of incandescent lamp 20
Light, Manufacture of 182
*Light effect in incandescent Lamps, Curious 238, 250
*Lightning, The protection of electric light stations from 83
Lowrie-Hall system in England, The 251
*Malden, Mass., The Thomson-Houston station at 315
*Mast arm, A new electric light 19
*Mast arm for arc lights, A new 304
*Mayo dynamo and lighting system, The 344
*Measurement of electricity in a house-to-house supply, On the 267
Mines, Electric lighting in 242
Miner's lamp, A new 161
National Electric Light Association, The 324
National Electric Light Association, The 273
*National Electric Light Association, Eighth meeting of the 118
Night firing, electric light in 315
Overhead conductors for electric light and power, Rules and regulations for 302
*Paiste incandescent switch, The 274
Paris, The electric light in 151
*Pittsburgh, Pa., An isolated lighting plant at 318
*Reflectors, Improved electric light 291
*Residences, Electric lighting of 338
*Schaefer incandescent lamp, The 105
*Schuyler Electric Company, New apparatus of the 184
*Search lamp, The new Thomson-Houston 150
Stampede Tunnel, Lighting the 206
*Station, A picturesque central 147
Static electricity, Incandescent lamps affected by 157
Static discharges on incandescent electric lamps, Effects of 149
Street lighting, A novel system of electric 342
Suits in England, The incandescent lamp 46
*Switch board, A large electric light 208
*Switch, A new automatic ground 19
*Switch for lamp circuits and secondary batteries, A new time 298
*Water columns for electric light plants, Safety 304
Waterhouse system, Sale of the 263
*Waterhouse arc lamp, The 241
Westinghouse manifestoes, Important 314
Westinghouse station and stage apparatus 255
*Westinghouse central station, A model 242
Wires, Alternating currents in electric light 330
*Yacht, Electric lighting on a 79

DYNAMOS, ETC.

Alternating vs. direct currents, A rejoinder to Mr. Brown 188
Alternating currents into New York city, The admission of 40
Alternating currents, The danger of 51
*Alternating currents, On the voltametric measurement of 244
Alternating current decision 86
*Baxter 100,000 watt generator, The 39
*Brush trimmer, A dynamo 255
*Condenser system of electrical distribution, A 274
*Commutator bars, drop-forged 316
Death current experiments at the Edison laboratory 312
*Decision in Boston, The alternating current 95
*Desrozier's multipolar disc dynamo, The 252
*Distribution by transformers, Some points in 194
*Distribution, On a system of 199
*Dynamos and motors, Designing 262
Dynamo construction, Practice in 26
*Electro-plating dynamo, A new 170
Electrolysis by the alternating-current of dynamo machines, On 56
*Engine and dynamo, A novel combination of 30
Electrostatic transformers 26
*Experiments on induction coils—IV 78
*Ferranti converter and meter, The 313
Magnetic circuit of dynamos, The influence of joints in the 315
*Medical dynamo, A new 197
Medicine, transformers in 194
*Otto gas-engine and dynamo combined 239
*Regulation of dynamos, Mechanical 238
*Regulation of dynamos, Mechanical 312
Regulator decision, The dynamo current 110
*Sparaing, A few points about 250
*Testing transformer, A 10,000-volt 338
*Vertical steam dynamo, A new 197
*Waterhouse method of dynamo regulation, The 175

MOTORS.

Alternating current motors, A problem in 28
*Baxter motor, the new 93
*Baxter one-quarter horse-power motor, The 151
*Baxter motor at the Julien station, New York, The 239
*Baxter motors of large horse-power 275
*Baxter motor for constant potential circuits, The 105
Baxter motor works at Baltimore, Md., Opening of the new 176
*Boat, An electric submarine torpedo 224
*Boat, A novel electrical 157
*Card electric motor, The new 255
Comstock mines, Electric power in the 187
*Crane, An electric 326
*Dog cart, a new electric 214
Eiffel tower, Electrical elevators for the 291
Ferranti alternate current motor 298
Holtz machine as a motor, The. Historical note 53
*Horse cleaning by electric motor 55
*Launch, "Viscountess Bury," The electric 253
*Lugo motor, The 15
*Mining, The application of electric motors to 7
*Motors, A testing room for electric 339
*Organ playing by electricity 251
*Printing presses, Electrical 327
*Rechniewski alternate current motor, The 158
*Rotary pump, Electric motor and 289
Series motor on constant potential circuit, The operation of a 231
*Sperry "double induction" motor, The 66
*Steam engine and electric motor for the same work, Relative displacement of a 3
*Steam engine, A motor preferred to a 340
*Straw hat factory, Electric power in 289
*Switch, An improved motor 172
*Switzerland, Electric power transmission in 115
Telpherage systems 255
Traveling crane, On the application of electricity to the working of a 20-ton 160
*Westinghouse motor and station switchboard arrangement, The new 222

INDEX TO VOLUME XII.

* Illustrated articles. The weekly Departments are not indexed.

150652

RAILWAYS.

Akron, Ohio, New Sprague road at..... 266
*"Ben Franklin," The Daft elevated railway motor..... 286
*"Benjamin Franklin," Experiments with the Daft electric railway motor..... 325
*Boston, West End, The Sprague electric road..... 341
*Car for electric railways, A double-ended. 214
*Crescent Beach, Mass., The Thomson-Houston electric road at..... 67
*Daft electric railway motors of 35 h. p.... 206
*Daft electric railway, Meriden, Conn., The 115
*Danville, Va., electric railway, The..... 240
Electric cars versus cable traction..... 93
Fourth avenue road, The storage cars on the..... 161
*Gearing for electric motor cars, The Jones & Rogers..... 253
*Hauss electric railway system, The..... 227
*Julien regulating switch for storage battery cars, The..... 27
*Julien station for storage car, New York, The..... 207
Layman's experience with electric roads, A 302
Locomotive, An accumulator..... 243
*Lynn, Mass., The Thomson-Houston road at..... 303
Municipal rapid transit problem, The solution of the (Supp. July 21).....1, 8
Paris, An electric tram car in..... 268
*Pittsburgh, Knoxville & St. Clair Railway, Daft motors on the..... 171
Railroads, Distant signals for..... 256
Railway, A new electric postal..... 183
*San Jose, Cal., electric road, The..... 275
*San José, Cal., The Fisher road at..... 327
Silvey alternating current street car system, The..... 288
Snell, Mr. A. T., A reply to..... 254
Snow on an electric road, Heavy..... 277
Sprague roads, Notes on some new..... 239
Sprague roads, Notes on three new..... 176
Sprague electric street railways, Notes on some..... 306
*Sprague street car motor and truck, The new..... 225
*Sprague electric street car truck, The new. 287
Sprague electric transfer table at Altoona, Pa..... 198
Sprague's Institute paper on electric railways, Discussion of..... 209
St. Catherine's, Can., The electric road in.. 280
St. Joseph, Mo. electric roads, The..... 329
*Switch for storage battery cars, Regulating (Corr.)..... 53
*Telpherage for mines..... 66
Thomson-Houston electric roads, Some new. 279
Underground haulage, Electricity and..... 342
Washington meeting of the American Street Railway Association..... 229
Wire rope railway, Electric transmission of power for a Swiss..... 171

BATTERIES, ELECTROLYSIS, ETC.

Accumulators, The management of..... 277
Alternating current, Electrolysis by means of the..... 158
America, Storage battery lighting in..... 286
Beattie's new battery carbon..... 342
Bleaching, Electro..... 325
Cell, A new constant..... 20
*Cox gelatine battery, The new..... 161
Dry primary and secondary batteries..... 94
*Duncan's secondary battery, Dr..... 324
Earth plate, Novel..... 253
Electrolysis by means of the alternating current..... 57
Electrolysis, Alternate current..... 242
*Faure's new secondary battery..... 231
*Galvanic and faradic medical battery, New cabinet..... 198
*Gibson storage battery, The..... 7
*Gravity battery measurements..... 52
*Hussey battery, The..... 224
*Internal resistance of a storage battery, Calculating the..... 182
Julien storage battery patent sustained, The 327
Julien storage patent, The status of..... 342
*Law battery, The new..... 106
Magnesium chloride solutions, The formation of certain new magnesium compounds in the electrolysis of..... 327
*O'Keeran primary battery, and its application to domestic electric lighting, The.. 5
Porous cup, A novel..... 66
Primary battery construction, A new departure in..... 340
*Secondary batteries and in machinery for their manufacture, Recent improvements in..... 224
Secondary batteries, Novel construction of.. 67
*Tests, Primary battery (Corr.)..... 106
*Tests, Primary battery..... 107
"Voltaic balance," The..... 108
Voltaic couples, Effects of different positive metals, etc., upon the changes of potential of..... 21
Weymersch battery, The..... 51
*Wright's novel primary battery..... 342

INSTRUMENTS, MEASUREMENTS, ETC.

*Ammeter for large currents..... 342
Ammeters, voltametric, Control of..... 243
*Ampère standard, A new..... 57
Coils, Compensated resistance..... 26
Coulomb meter, A novel..... 67
*Eddy's electric measuring instrument..... 243
*Geyer-Bristol meter for direct and alternating currents, The..... 280
*Howell voltmeter with Clark standard cell, The new..... 81
*Hydrometer, The Hicks glass bead..... 78
*Indicator, A novel electric current..... 188
*Inductometer, A new..... 57
*Integraph, The Abdank magnetic call and. 279
*Meter, A new electric..... 838
*Meter, Prof. Forbes' latest electric..... 80
Meters, Prizes for electric..... 106
Pentane lamp, Tests of the No. 2..... 251
*Photometer, Mr. Vernon Harcourt's new.. 159
*Shallenberger's alternating current meter. 94, 149
*Shuckert's Coulombmeter..... 252
*Speed indicator, The Heath patent self-timing..... 56
*Testing instruments, Some new..... 208
*Weston's new measuring instruments..... 263

MISCELLANEOUS.

*Abdank magnetic call and integraph..... 279
*Absolute vacuum as a non-conductor of electricity, and the important bearing of the fact upon electric theories..... 329
Alcohol, The electrolytic purification of.... 305
Alloys for electric conductors, Weston's new..... 39
American Institute of Electrical Engineers, Meeting of the..... 184, 277
American Institute of Electrical Engineers, Meeting of the..... 342
American Association for the Advancement of Science, at Cleveland, O., Meeting of the 110
Ampère, A statue to..... 243
*Animal electricity and surface tension, On the relation between..... 92
Animal organisms, The electricity of..... 151
Aqueous vapor, The electrification of..... 85
Aurora borealis, Origin of the..... 26
*Barometer, Stephen's electrical..... 18
*Baxter gravity drop, The..... 243
*Bell, A two-call indicating..... 161
*Bell, A new two call..... 188
Body, Effects of static electricity and lightning on..... 340
Books, About electrical..... 57
British Association meeting at Bath, The, 138, 156
Brown, reply to Mr. Harold P., A..... 134
Brown, experiments, A Defense of the..... 160
Buffalo Electrical Society..... 185
Burglar alarm and window circuit changer, New..... 214
*Burglar alarm window spring..... 66
Carbon, Some experiments on..... 228
Cincinnati Electrical Society, The..... 214
*Cincinnati Electrical Exposition, Electricity at the..... 185
*Cincinnati Centennial Exposition, The novel electrical displays at the..... 212
Clambake of the year, The..... 148
Comparing very unequal capacities, On a method of..... 53
*Condenser on disruptive discharges, The influence of the..... 2
Conductivity of metals and other physical constants, Electrical..... 108
Congress of electricians, 1889, The international..... 92
Copper syndicate, The..... 250
Copper, The specific resistance of..... 188
Copper at low temperature, The electric resistance of..... 67
*Cowles aluminum process in England, The 172
*Davis police signal system, The..... 200
Delany's safety device for linemen..... 8
Discharge, electric, Influence of light on the. 230
*Dogs, Experiments with electric currents on..... 72
Earth, The electro-chemical action of the, 157
Eastman's pellicular paper, Phenomena produced by electric discharges on..... 344
Edison laboratory, Meeting of the New York Electrical Society at the..... 238
Electricity, A practical lecture on..... 198
Electricity, Conceptions of the nature of.. 183
Electricty is truth..... 305
*ELECTRICAL WORLD Portraits, II., Elihu Thomson (with portrait supplement)..... 102
Electrometric determination of "V"..... 228
Execution by electricity, A report on..... 275
Fish, Another electrical..... 256
*Floor push and table attachment, Combination..... 256
*Floor key and movable table button, Combination..... 243
Gas-lighting circuits, An experience with electric..... 256
Gaulard, Lucien, Obituary..... 324
*Glaeser influence machine, The..... 14
*Heart, The electromotive properties of the human..... 240
Heating by electricity..... 197, 256
*Heroult aluminum process, The..... 265
Hoists for mine inclines, Electric..... 66
Human organism, The influence of electricity on the..... 157
Insulation, Flexible hard rubber..... 239
Iron and lead covering for cables, The relative merits of..... 19
Johnston, Mrs. W. J., Sudden death of..... 273
Lead pipes, The corrosion of..... 184
*Lightning flashes, The duration of..... 324
*Lightning. Photographing..... 14
Lightning flashes, Photographs of..... 149
Lightning rods, Lombardy poplars as..... 198
*Lightning arrester, The Law..... 172
*Long's electric semaphore signal..... 314
Lubricating commutators, French chalk for..... 214
*"Lungen" bell, The..... 274
*Magnet winder, A handy..... 93
*Magnetic propagation, Phenomena of..... 220
Magnetic Field, Chemical action in a..... 92
Magnetization of iron and other magnetic metals in very strong fields, On the..... 330
Mercury, Filtration of..... 268
Mica as a dielectric, The use of..... 298
Moebius electrical process for refining silver, The..... 102
New York Electric Club, Meeting of..... 344
New York Electrical Society, Meeting of the..... 214
Okonite wire in England..... 4
Ore separator, The Edison magnetic..... 312
Patent appeals in Congress, The court of... 174
Phenomena, Mechanical explanation of electric..... 331
Phosphor bronze wires, Jointing without heat..... 102
Photographic films, Electric action on..... 230
Physiological tests with electric currents.. 69
Physiology, Electro..... 343
*Potential geometry.—I., II.....29, 54
Power, Electric, Prices charged for..... 226
*Push buttons, New styles of..... 228
*Quadruplex, Improvement in the (Corr.).. 231
Rents, Electric..... 331
*Rogers' auxiliary fire alarm, The..... 196
Rotary motions found in lightning and other electrical currents, Peculiar..... 278
Scrap books, Electrical..... 326
Ships, Galvanic action in..... 226
Shock, Personal experience of a..... 182
Soap bubbles and electricity, Experiments on..... 26
Soft iron bars, The magnetization of..... 208
*Solar radiant energy, Utilizing..... 158
Static electricity, Vortex analogue of..... 257
Sugar, Electric refining of..... 158
Thunderstorms, Report on..... 15
Tinning by simple immersion..... 148
Tornadoes, Electric phenomena accompanying..... 252
*Valve controller, Automatic electric..... 56
Vibration, Universality of..... 241
Water, The action of electricity on the vesicles of condensed..... 291
Watch manufacture, Recent problems of American..... 345
Watches, Proper tests for non-magnetic.... 269
Watches, Magnetism in..... 19
Wave lengths, Electro-magnetic..... 226
*Welding apparatus, Thomson's new electric, 3
Welding, Electric..... 290
*Welding apparatus, Thomson's electric.... 243
Wires carrying heavy currents on wires carrying weak currents, The influence of, 114, 138

SUBWAYS.

Board of Electrical Control, Meeting of the. 230
Board of Electrical Control, Important meeting of the..... 176
Board of Electrical Control, Meeting of the. 318
*Brooks underground system in Brooklyn, The..... 301
Cables laid in creosoted wooden conduits, On the deterioration of lead sheathing on. 289
*Conduits, Gas mains as electrical..... 328
*Irish's conduit for electric wires..... 54
Leaks in underground conductors, Detecting 39
*National underground system, The 268
Subway Board, Meeting of the New York.. 276
Subway Board proceedings..... 344
Subway Board, Work of the..... 331
*Subway explosion in New York, A..... 226
*Subways and the steam pipes..... 242, 254

MECHANICAL.

*Ætna high-speed engines for electric lighting, The..... 317
*Beck vertical engine, New..... 228
*Belt-shifter, The "Practical"..... 106
*Curtis combined steam separator and trap, The..... 30
*"Dick & Church" automatic engine, The.. 109
*Hazelton stationary boiler for electric stations, The..... 291
*High speed engine, A new compound condensing..... 187
*"Ideal" engine, The..... 343
*"Meyer" electric light engine, The..... 328
*Oil engine for lighting small plants, The Richards..... 268
*Schenck's new belt-holder and shifter for dynamos..... 175
*Stilwell live steam feed water purifier, The..... 135